

NATIONAL SPACE COUNCIL



USERS' ADVISORY GROUP

MEMBER BIOGRAPHIES



Admiral James Ellis, Jr., USN, Retired
User Advisory Group Chairman

James O. Ellis, Jr. retired as President and Chief Executive Officer of the Institute of Nuclear Power Operations (INPO), located in Atlanta, Georgia, on May 18, 2012. INPO, sponsored by the commercial nuclear industry, is an independent, nonprofit organization whose mission is to promote the highest levels of safety and reliability -- to promote excellence -- in the operation of nuclear electric generating plants.

In 2004, Admiral Ellis completed a distinguished 39-year Navy career. His final assignment was Commander of the United States Strategic Command during a time of challenge and change. In this role, he was responsible for the global command and control of United States strategic and space forces, reporting directly to the Secretary of Defense.

A 1969 graduate of the U.S. Naval Academy, Admiral Ellis was designated a Naval aviator in 1971. His service as a Navy fighter pilot included tours with two carrier-based fighter squadrons, and assignment as Commanding Officer of an F/A-18 strike/fighter squadron. In 1991, he assumed command of the USS Abraham Lincoln, a nuclear-powered aircraft carrier. After selection to Rear Admiral, in 1996 he served as a carrier battle group commander leading contingency response operations in the Taiwan Straits.

His shore assignments included numerous senior military staff tours; senior command positions included Commander in Chief, U.S. Naval Forces, Europe and Commander in Chief, Allied Forces, Southern Europe during a time of historic NATO expansion. He led United States and NATO forces in combat and humanitarian operations during the 1999 Kosovo crisis.

Mr. Ellis holds a master's degree in aerospace engineering from the Georgia Institute of Technology and, in 2005, was inducted into the school's Engineering Hall of Fame. He completed United States Navy Nuclear Power Training and was qualified in the operation and maintenance of naval nuclear propulsion plants. He is a graduate of the Navy Test Pilot School and the Navy Fighter Weapons School (Top Gun). In 2013, Mr. Ellis was elected to the National Academy of Engineering.

In 2009 he completed three years of service as a Presidential Appointee on the President's Intelligence Advisory Board and, in 2006, he was a member of the Military Advisory Panel to the Iraq Study Group.

Mr. Ellis currently serves as an Annenberg Distinguished Fellow at the Hoover Institution at Stanford University. A former Chairman of the Board of the Space Foundation, in 2018 he was appointed Chairman of the User's Advisory Group to the Vice President's National Space Council. He is the former Chairman of the Board of Level 3 Communications and serves on the board of directors of the Lockheed Martin Corporation and Dominion Resources, Inc.

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Colonel Buzz Aldrin, USAF, Retired

Commander Aldrin grew up in Montclair, New Jersey. Buzz graduated one year early from Montclair High School and he attended the US Military Academy at West Point, graduating third in his class with a BS in mechanical engineering. He then joined the Air Force where he flew F86 Sabre Jets in 66 combat missions in Korea, shot down two MIG15's, and was decorated with the Distinguished Flying Cross. After a tour of duty in Germany flying F100's, he earned his Doctorate of

Science in Astronautics at MIT and wrote his thesis on Manned Orbital Rendezvous. Selected by NASA in 1963 into the third group of astronauts, Aldrin was the first with a doctorate and became known as "Dr. Rendezvous."

The docking and rendezvous techniques he devised for spacecraft in Earth and lunar orbit became critical to the success of the Gemini and Apollo programs, and are still used today. He pioneered underwater training techniques to simulate spacewalking. In 1966 on the Gemini 12 orbital mission, Buzz performed the world's first successful spacewalk – extra-vehicular activity (EVA), and set a new EVA record of 5 1/2 hours. During that mission he also took the first 'selfie' in space. On July 20, 1969, Buzz and Neil Armstrong made their historic Apollo 11 moonwalk, becoming the first two humans to set foot on another world. An estimated 600 million people – at that time, the world's largest television audience in history – witnessed this unprecedented heroic endeavor.

Since retiring from NASA and the U.S. Air Force, Col. Aldrin calls himself a Global Statesman for Space and has remained a tireless advocate for human space exploration.

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Salvatore T. "Tory" Bruno

President and CEO, United Launch Alliance

Salvatore T. "Tory" Bruno is the president and CEO for United Launch Alliance (ULA). In this role, Bruno serves as the principal strategic leader of the organization and oversees all business management and operations. Prior to joining ULA, he served as the vice president and general manager of Lockheed Martin Strategic and Missile Defense Systems. He is a former member of the board of directors of Lockheed

Martin U.K. Ltd.

Bruno joined Lockheed Martin in 1984. He previously served as vice president and general manager of FBM and ICBM. He holds a bachelor's degree in mechanical engineering from the California Polytechnic State University, in San Luis Obispo, California, and has completed graduate courses and management programs at Harvard University, Santa Clara University, the Wye River Institute, San Jose State University and the Defense Acquisition University. Bruno is an American Institute of Aeronautics

and Astronautics (AIAA) Fellow, a companion of the Naval Order of the United States, a member of the Navy League and a former member of the Board of Directors of the Silicon Valley Leadership Group. He served on the National Blue Ribbon Panel for Bettering Engineering & Science Education and as Chairman of the Diversity Council of Lockheed Martin Space Systems. He is the author of two books that explore the organization of the medieval Knights Templar from the perspective of modern business management: "Templar Organization: The Management of Warrior Monasticism" and "Templar Incorporated." He is a recipient of the Order of Merit of the Sovereign Military Order of the Temple of Jerusalem.

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Mr. Dean Cheng

Research Fellow, Heritage Foundation

Dean brings detailed knowledge of China's military and space capabilities to bear as The Heritage Foundation's research fellow on Chinese political and security affairs. He specializes in China's military and foreign policy, in particular its relationship with the rest of Asia and with the United States.

Cheng has written extensively on China's military doctrine, technological implications of its space program and "dual use" issues associated with the communist nation's industrial and scientific infrastructure. He previously worked for 13 years as a senior analyst, first with Science Applications International Corp. (SAIC), the Fortune 500 specialist in defense and homeland security, and then with the China Studies division of the Center for Naval Analyses, the federally funded research institute. Before entering the private sector, Cheng studied China's defense-industrial complex for a congressional agency, the Office of Technology Assessment, as an analyst in the International Security and Space Program. Cheng has appeared on public affairs shows such as John McLaughlin's One on One and programs on National Public Radio, CNN International, BBC World Service and International Television News (ITN).

He has been interviewed by or provided commentary for publications such as Time magazine, The Washington Post, Financial Times, Bloomberg News, Jane's Defense Weekly, South Korea's Chosun Ilbo and Hong Kong's South China Morning Post. Cheng has spoken at the National Space Symposium, National Defense University, the Air Force Academy, Massachusetts Institute of Technology (MIT) and Eisenhower Center for Space and Defense Studies. Cheng earned a bachelor's degree in politics from Princeton University in 1986 and studied for a doctorate at MIT. He and his wife reside in Vienna, VA.

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Colonel Eileen Collins, USAF, Retired

Collins graduated in 1979 from Air Force Undergraduate Pilot Training at Vance AFB, Oklahoma, where she was a T-38 instructor pilot until 1982. She was a C-141 aircraft commander and instructor pilot and was assigned to the U.S. Air Force Academy as an assistant professor in mathematics and a T-41 instructor pilot. She was selected for the astronaut program while attending the Air Force Test Pilot School at Edwards AFB, California, from which she graduated in 1990. Collins retired from the Air Force in January 2005.

Selected by NASA in January 1990, Collins became an astronaut in July 1991. Initially assigned to Orbiter engineering support, Collins has also served on the astronaut support team responsible for Orbiter prelaunch checkout, final launch configuration, crew ingress/egress, landing/recovery, worked in Mission Control as a spacecraft communicator (CAPCOM), served as the Astronaut Office Spacecraft Systems Branch Chief, Chief Information Officer, Shuttle Branch Chief, and Astronaut Safety Branch Chief. Collins served as pilot on STS-63 (February 3-11, 1995) and STS-84 (May 15-24, 1997), and was the commander on STS-93 (July 22-27, 1999) and STS-114 (July 26 to August 9, 2005). A veteran of four space flights, Collins has logged over 872 hours in space. Collins retired from NASA in May 2006.

Collins received an associate in science degree in mathematics/science from Corning Community College in 1976; a bachelor of arts degree in mathematics and economics from Syracuse University in 1978; a master of science degree in operations research from Stanford University in 1986; and a master of arts degree in space systems management from Webster University in 1989. Collins is currently retired, and serves on several boards and advisory panels, including the National Academies' Aerospace Science and Engineering Board and the Astronaut Memorial Foundation.

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The Honorable Steve Crisafulli

Former Speaker, Florida House of Representatives

Speaker Crisafulli is a former Republican member of the Florida House of representatives, representing District 51 from 2008 to 2016. He served as Speaker of the House and was Majority Leader in 2014.

Crisafulli did not seek re-election to the Florida House of Representatives in 2016 because of term-limits. Crisafulli served as Supervisor of Brevard County Soil and Water Conservation from 1998 to 2002.

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Dr. Mary Lynne Dittmar

President and CEO, Coalition for Deep Space Exploration
President and CEO, Dittmar Associates

Dr. Mary Lynne Dittmar is President and CEO of the Coalition for Deep Space Exploration, an industry trade group supporting human exploration, science, commerce, and American leadership in space. Under her leadership the Coalition has grown from 5 companies to more than 70 over the past four years and is a recognized source for policy, technical and business information in the aerospace and defense sector.

Earlier in her career Dr. Dittmar managed the mission operations group for The Boeing Company on the International Space Station Program. Later, she acted as a special advisor to the NASA Astronaut Office before her appointment as Boeing Chief Scientist for Commercial Utilization of the ISS. More recently she was Senior Policy Advisor to International Space Station National Laboratory. She has also served as a senior advisor to NASA, the DoD, and the FAA.

Mary Lynne is a Fellow of the National Research Society and an Associate Fellow of the American Institute for Astronautics and Aeronautics. From 2012-2014 she served as a member of the National Research Council Committee on Human Spaceflight, and is beginning her third term as a member of the Executive Committee of the Space Studies Board of the National Academies of Sciences, Engineering and Medicine. In June of 2018 she was appointed as a member of the Users' Advisory Group of the National Space Council, and in October of 2018 also was appointed to the Commercial Space Transportation Advisory Committee for the Department of Transportation/FAA. Dr. Dittmar resides in Washington, D.C.

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Ms. Mandy F. Vaughn

President, VOX Space

Mandy Vaughn is the President of VOX Space. Mandy originally joined Virgin Orbit, VOX Space's parent company, in 2015. As Senior Director of Business Development and Mission Management, she supported business development on the LauncherOne program for both government and commercial customers, and served as mission manager for customers including OneWeb and NASA, in addition to spearheading the creation and registration of VOX Space.

Prior to joining Virgin Orbit, Mandy was with General Dynamics Mission Systems' Space and Intelligence Systems Directorate, where she was responsible for the space control and space protection investment portfolios and analog-to-digital transitions for a variety of SIGINT payload families. She successfully initiated development programs for the next-generation space-based GPS receiver and managed the internal investment of GPS payload development efforts.

Prior to joining General Dynamics, she was a developmental engineer and program manager in the Air Force and a Director with Kinsey Technical Services. She primarily supported programs in the Space Superiority Systems Directorate (SMC/SY) at Los Angeles AFB, CA and earlier the ICBM system program office at Hill AFB, UT. In the Space Superiority mission area, she was the ground segment lead and chief engineer on the Space-Based Space Surveillance program, and then supported a variety of space and ground-based programs for the Directorate. In that role, she supported a multiple Space Situational Awareness and command and control programs supporting integration of requirements and demonstrations between the DoD and the intelligence community. She supported the NRO AS&T and DIA Directorate of Science and Technology in a variety of collection campaigns that spanned various collection system phenomena to demonstrate new systems and operational concepts for critical space operations.

Mandy has a BS in Mechanical Engineering and an MS in Aeronautics and Astronautics, both from MIT.

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Ms. Marillyn A. Hewson

Chairman, President, and CEO of Lockheed Martin Corporation

Ms. Hewson is Chairman, President and CEO of Lockheed Martin Corporation. Ms. Hewson joined Lockheed Martin more than 30 years ago as an industrial engineer. During her career she has held several operational leadership positions, including President of Lockheed Martin Systems Integration; Executive Vice President of Global Sustainment for Lockheed Martin Aeronautics; President and General Manager of Kelly Aviation Center, L.P., an affiliate of Lockheed Martin; and President of Lockheed Martin Logistics Services. She has also served in key corporate executive roles, including Senior Vice President of Corporate Shared Services; Vice President of Global Supply Chain Management; and Vice President of Corporate Internal Audit.

Ms. Hewson has served on numerous boards and currently sits on the Board of Directors of DowDuPont, the Congressional Medal of Honor Foundation, the Board of Governors of the USO, and the Board of Directors of Catalist. She is a member of The University of Alabama's President's Cabinet and also serves on the Board of Visitors of the Culverhouse College of Commerce and Business Administration. In 2017, Fortune magazine identified Ms. Hewson as No. 3 on the "50 Most Powerful Women in Business." She has also been recognized as a Top 10 "Businessperson of the Year" by Fortune, as one of the "World's 100 Most Powerful Women" by Forbes, and as one of the "Bloomberg 50" – the leaders who defined 2017.

Born in Junction City, Kansas, Ms. Hewson earned her Bachelor of Science degree in business administration and her Master of Arts degree in economics from the University of Alabama. She also attended the Columbia Business School and Harvard Business School executive development programs.

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Mr. Homer Hickam, Jr.

Mr. Hickam graduated from Big Creek High School in 1960 and from the Virginia Polytechnic Institute (Virginia Tech) in 1964 with a BS degree in Industrial Engineering. A U.S. Army veteran, Mr. Hickam served as a First Lieutenant in the Fourth Infantry Division in Vietnam in 1967-1968 where he won the Army Commendation and Bronze Star medals. He served six years on active duty, leaving the service with the rank of Captain.

Hickam has been a writer since 1969 after his return from Vietnam. His latest work, published in October, 2015, is the critically acclaimed novel *Carrying Albert Home: The Somewhat True Story of a Man, his Wife, and her Alligator*. While working on his writing career, Mr. Hickam was employed as an engineer for the U.S. Army Missile Command from 1971 to 1981 assigned to Huntsville, Alabama, and Germany. He began employment with the National Aeronautics and Space Administration at Marshall Space Flight Center in 1981 as an aerospace engineer. During his NASA career, Mr. Hickam worked in spacecraft design and crew training. His specialties at NASA included training astronauts on science payloads, and extravehicular activities (EVA). He also trained astronaut crews for many Spacelab and Space Shuttle missions, including the Hubble Space Telescope deployment mission, the first two Hubble repair missions, Spacelab-J (the first Japanese astronauts), and the Solar Max repair mission.

Prior to his retirement in 1998, Mr. Hickam was the Payload Training Manager for the International Space Station Program. In 1984, Mr. Hickam was presented with Alabama's Distinguished Service Award for heroism shown during a rescue effort of the crew and passengers of a sunken paddleboat in the Tennessee River. Because of this award, Mr. Hickam was honored in 1996 by the United States Olympic Committee to carry the Olympic Torch through Huntsville, Alabama, on its way to Atlanta. Mr. Hickam is married to Linda Terry Hickam, an artist and his first editor and assistant.

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The Honorable Kay Ivey

Governor of Alabama

Governor Ivey is the 54th and current Governor of Alabama. She was sworn into office on April 10, 2017, following the resignation of Gov. Robert J. Bentley (R). She previously served as lieutenant governor from January 2011 to April 2017. She was elected to the position in 2010 and re-elected in 2014. Ivey was the first Republican in the state's history to serve two consecutive terms in the lieutenant governor's

office.

Initially a candidate for governor in 2010, Ivey switched to the lieutenant governor's race on March 31, 2010. She went on to defeat incumbent Jim Folsom, Jr. (D) by a slim margin in the general election on November 2, 2010. The victory made Ivey the first Republican woman to be elected lieutenant governor in the state's history. Ivey was first elected to statewide office in 2002, defeating Democratic opponent Stephen Foster Black in the general election to win election as state treasurer of Alabama.

She served two terms in this office before becoming lieutenant governor in 2011. Prior to entering public service, Ivey was director of government affairs for the Alabama Commission on Higher Education from 1985 to 1998, assistant director of the Alabama Development Office from 1982 to 1985 and a reading clerk for the Alabama House of Representatives from 1980 to 1982. Ivey was also assistant vice president of Merchants National Bank/Regions Bank from 1970 to 1979. Ivey was raised in Camden, Alabama. She attended Auburn University, Duke University's Governor's Center for Public Policy, Alabama Banking School and the University of Colorado School of Banking. Her professional experience includes working as a high school teacher, a bank officer, and as assistant director of the Alabama Development Office.

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Mr. Fred Klipsch

Mr. Klipsch has spent his life building successes in the business world and is now working to increase success in the classroom. He was educated in the public school system from grade school through graduate school. Mr. Klipsch earned a bachelor's degree from Purdue University in 1964 and a MBA degree from California State University at Long Beach in 1968. In 2007, Mr. Klipsch was awarded an honorary PhD in Technology from Purdue University. He also served as an officer in the United States Air Force from 1964 to 1968.

Since 1979, Mr. Klipsch has acquired multiple healthcare operations and development companies including hospitals, medical buildings, retirement centers, nursing homes and assisted living facilities. From 1989 to 1996 Mr. Klipsch was Chairman and majority owner of national Guest Homes (NGH), a developer and operator of assisted living centers across the southern part of the U.S.A. In 1996 the company was sold to Marriott International (NASDAQ: MAR).

From 1989 to 2002, Mr. Klipsch was Chairman and majority owner of Hospital Affiliates Development Corporation (HADC), a medical properties development company active in the United States and Europe. In 2002, HADC was contributed to Windrose Medical Properties Trust (NYSE: WRS) as a wholly owned subsidiary. Mr. Klipsch served as Chairman and CEO of WRS from its formation and IPO in 2002 until merging with Healthcare REIT (NYSE: HCN) in 2006. During that 4-year cycle WRS acquired, developed, or had under contract approximately \$1 billion in assets.

Also in 1989, Mr. Klipsch and his wife Judy purchased Klipsch Group Inc., a small premium boutique domestic loudspeaker company owned by his second cousin, Paul Klipsch, located in Hope, Arkansas. Over the next 22 years Mr. Klipsch, as Chairman and CEO, and majority owner, expanded its product offerings to include only high performance products for listening to music and movies, eventually becoming the number one high performance line sold in the United States and a leader in the global market. In 2005, Klipsch Group, Inc., expanded globally, opening offices in Paris and Shanghai. Klipsch Group was sold to VOXX International (NYSE: VOXX) in 2011. Since the sale of Klipsch Group, Mr. Klipsch has focused his business activities through Klipsch Strategic Partners, LLC.

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General Lester Lyles, USAF, Retired

Retired from the United States Air Force after a distinguished 35 year career, most recently as Commander, Air Force Material Command, Wright-Patterson Air Force Base, Ohio. Prior to that he served as Air Force Vice Chief of Staff and Chief Technology Officer, and Director of the Ballistic Missile Defense Organization at the Department of Defense.

He is a senior executive with over 26 years experience running large, high-technology organizations involved in aeronautical and astronautical research, development, acquisition and logistics. Gen. Lyles is a director of General Dynamics Corp. and KBR Corp., previously serving on the board of directors for Precision Castparts Corp. He is Chairman of the NASA Advisory Council, a member of the Air Force Scientific Advisory Board, and was elected to the National Academy of Engineers in 2011.

Lyles also served as a member of the President's Intelligence Advisory Board in the White House, the Defense Science Board, and the International Security Advisory Board (ISAB) in the State Department. His awards include the Defense Distinguished Service Medal, Distinguished Service Medal, Defense Superior Service Medal and Legion of Merit. Lyles received a bachelor's degree in mechanical engineering from Howard University. He received a master's degree in mechanical/nuclear engineering, as well as honorary doctors of laws, from New Mexico State University and Urbana University.

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Colonel Pamela Melroy, USAF, Retired

Col Melroy was commissioned through the Air Force Reserve Officers' Training Corps (ROTC) program in 1983. After completing a Master's degree, she attended undergraduate pilot training at Reese Air Force Base in Lubbock, Texas, and graduated in 1985. Melroy flew the KC-10 for six years at Barksdale Air Force Base in Bossier City, Louisiana, as a copilot, aircraft commander and instructor pilot. In June 1991, she attended the Air Force Test Pilot School at Edwards Air Force Base,

California.

Upon her graduation, she was assigned to the C-17 Combined Test Force, where she served as a test pilot until her selection for the Astronaut Program. Colonel Melroy retired from the Air Force in February 2007. Selected as an astronaut candidate by NASA in December 1994, Colonel Melroy completed a year of training and evaluation and was qualified for flight assignment as a shuttle pilot. Initially assigned to astronaut support duties for launch and landing, she also worked advanced projects for the Astronaut Office. Colonel Melroy served on the Columbia Reconstruction Team as the lead for the crew module and served as Deputy Project Manager for the Columbia Crew Survival Investigation Team.

In her final position, she served as Branch Chief for the Orion branch of the Astronaut Office. Colonel Melroy served as pilot on two flights (STS-92 in 2000 and STS-112 in 2002) and was the mission commander on STS-120 in 2007, making her one of only two women who commanded the space shuttle.

She has logged more than 924 hours (more than 38 days) in space. Colonel Melroy left the agency in August 2009 and currently serves as Deputy Director, Tactical Technology Office at the Defense Advanced Research Projects Agency (DARPA). She graduated from Bishop Kearney High School, Rochester, New York, in 1979. Bachelor of Arts degree in Physics and Astronomy from Wellesley College, 1983. Master of Science degree in Earth and Planetary Sciences from Massachusetts Institute of Technology, 1984.

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Mr. Dennis A. Muilenburg

Chairman, President, and CEO, The Boeing Co.
Chairman, Aerospace Industries Association
Chairman, President, and CEO, Boeing HorizonX
President, The Boeing Co. (Illinois)

Mr. Muilenburg is President & Chief Executive Officer at The Boeing Co., Chairman, President and Chief Executive Officer at Boeing HorizonX and President at The Boeing Co. (Illinois). He is on the Board of Directors of Caterpillar Inc., the U.S.-China Business Council, the Congressional Medal of Honor Foundation, Northwestern University and FIRST (For Inspiration and Recognition of Science & Technology) and the Business Roundtable, an association of chief executive officers of leading U.S. companies. He is past chairman of the Aerospace Industries Association (AIA) board of governors and a current AIA executive committee member. He also serves on the board of trustees for the National World War II Museum. He is an honorary fellow of the American Institute of Aeronautics and Astronautics (AIAA), a fellow of the Royal Aeronautical Society and a member of the National Academy of Engineering (NAE). Mr. Muilenburg was previously employed as President & Chief Executive Officer by Boeing Defense, Space & Security, President by Boeing Ventures, and Executive Vice President by Boeing Capital Corp. He received his undergraduate degree from Iowa State University and a graduate degree from the University of Washington.

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Mr. Fatih Ozmen

CEO and Owner, Sierra Nevada Corporation (SNC)

Ozmen is CEO of Sierra Nevada Corporation (SNC), the global aerospace and national security leader based in Sparks, Nevada. SNC is solely owned by Fatih and his wife, Eren Ozmen, who is SNC's Chairwoman and President. Living a true American Dream story, the Ozmens came to the US separately as graduate students. They connected in Reno and after several years at SNC, where Fatih began his career as an intern and Eren served as controller, they acquired company and have since grown it into the top female-owned defense contractor in the U.S. Best known publicly for SNC's Dream Chaser® spacecraft, which will service the International Space Station under contract with NASA in 2021, SNC has become a trusted partner to civil, commercial, and national security customers worldwide. Fatih's commitment to advancing American leadership in technological innovation, along with his pay-it-forward spirit, inspire future generations and the consistent growth of American jobs.

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Dr. Eric Schmidt

Technical Advisor, Alphabet Inc.

Eric Schmidt is Technical Advisor to Alphabet Inc., holding company of Google Inc, where he advises its leaders on technology, business and policy issues.

Eric was Executive Chairman of Alphabet from 2015-2018, and of Google from 2011-2015.

From 2001-2011, Eric served as Google's Chief Executive Officer, overseeing the company's technical and business strategy alongside founders Sergey Brin and Larry Page. Under his leadership, Google dramatically scaled its infrastructure and diversified its product offerings while maintaining a strong culture of innovation, growing from a Silicon Valley startup to a global leader in technology.

Prior to joining Google, Eric was the chairman and CEO of Novell and chief technology officer at Sun Microsystems, Inc. Previously, he served on the research staff at Xerox Palo Alto Research Center (PARC), Bell Laboratories and Zilog. He holds a bachelor's degree in electrical engineering from Princeton University as well as a master's degree and Ph.D. in computer science from the University of California, Berkeley.

Eric was elected to the National Academy of Engineering in 2006 and inducted into the American Academy of Arts and Sciences as a fellow in 2007. Since 2008, he has been a trustee of the Institute for Advanced Study in Princeton, New Jersey. Since 2012, Eric has been on the board of the Broad Institute and the Mayo Clinic. Eric was a member of the President's Council of Advisors on Science 2009-2017. In 2013, Eric and Jared Cohen co-authored The New York Times bestselling book, The New Digital Age: Transforming Nations, Businesses, and Our Lives. In September 2014, Eric published his second New York Times bestseller, How Google Works, which he and Jonathan Rosenberg co-authored with Alan Eagle. In April 2019, Eric published his third New York Times bestseller, Trillion Dollar Coach: The Leadership Playbook of Silicon Valley's Bill Campbell, which he co-authored with Jonathan Rosenberg and Alan Eagle.

Eric became the Chairman of the Department of Defense's Innovation Board in 2016 and was awarded the Department of Defense Medal for Distinguished Public Service in January of 2017 by Secretary of Defense Ashton Carter. He is Chairman of the US National Security Commission for Artificial Intelligence. He is a member of NASA's National Space Council User Advisory Group which is chaired by the Vice President. Eric is an MIT Visiting Innovation Fellow, member of the Advisory Board for MIT IQ, member of the MIT Commission on the Work of the Future, member of the MIT CEO Advisory Board, and member of the MIT Schwarzman College of Computing Advisory Council. Eric is founder of Schmidt Futures which helps exceptional people do more for others by applying science and technology thoughtfully and working together across fields.

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The Honorable Harrison "Jack" Schmitt

Selected for the Scientist-Astronaut program in 1965, Schmitt organized the lunar science training for the Apollo Astronauts, represented the crews during the development of hardware and procedures for lunar surface exploration, and oversaw the final preparation of the Apollo 11 Lunar Module Descent Stage. He was designated Mission Scientist in support of the Apollo 11 mission. After training as back-up Lunar Module Pilot for Apollo 15, Schmitt served as Lunar Module Pilot for Apollo 17—the last Apollo mission to the moon. On December 11, 1972, he landed in the Valley of Taurus-Littrow as the only scientist and the last of 12 men to step on the Moon. In 1975, after two years managing NASA's Energy Program Office, Schmitt fulfilled a longstanding personal commitment by entering politics. Elected in 1976, he served a six year term in the U.S. Senate beginning in 1977. Senator Schmitt, the only "natural scientist" in the Senate since Thomas Jefferson was Vice-President of the United States, was a member of the Senate Commerce, Banking, Appropriations, Intelligence, and Ethics Committees. In his last two years in the Senate, Schmitt held the position of Chairman of the Commerce Subcommittee on Science, Technology, and Space and of the Appropriations Subcommittee on Labor, Health and Human Services, and Education.

Harrison Schmitt is currently Chairman of the NASA Advisory Council. He consults, speaks and writes on policy issues of the future, the science of the Moon and Planets, and the American Southwest. His scientific research concentrates primarily on the synthesis of data related to the origin and evolution of the Moon and the terrestrial planets and on the economic geology of the lunar regolith and its resources. Schmitt presently is Adjunct Professor of Engineering, University of Wisconsin-Madison, teaching "Resources from Space." Schmitt's book, "Return to the Moon—Exploration, Enterprise, and Energy in the Human Settlement of Space," was published by Springer in 2006. Since 1964, he has been the author of many scientific journal papers and book chapters related to exploration, space and lunar science.

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Ms. Gwynne Shotwell

President and COO, Space Exploration Technologies Corporation (SpaceX)

As President and COO of SpaceX, Gwynne Shotwell is responsible for day-to-day operations and managing all customer and strategic relations to support company growth. She joined SpaceX in 2002 as Vice President of Business Development and built the Falcon vehicle family manifest to more than 100 launches, representing more than \$10 billion in business. Shotwell is a member of the SpaceX Board of Directors.

Prior to joining SpaceX, Shotwell spent more than 10 years at the Aerospace Corporation, holding positions in Space Systems Engineering, Technology and Project Management. She was promoted to the role of Chief Engineer of an MLV-class satellite program, managed a landmark study for the Federal Aviation Administration on commercial space transportation, and completed an extensive analysis of space policy for NASA's future investment in space transportation.

In addition to being named the 2018 Satellite Executive of the Year, Shotwell was awarded the AIAA Goddard Astronautics Awards as well as the American Society of Mechanical Engineers Ralph Coats Roe Medal. Fortune Magazine placed Shotwell at #42 on their list of the World's 50 Greatest Leaders in 2018 and Forbes named her #70 on their list of Power Women in 2017. In 2014, Shotwell was appointed to the United States Export Import Bank's Advisory Committee and the Federal Aviation Administration's Management Advisory Council. Shotwell was elected to the honorable grade of Fellow with the American Institute of Aeronautics and Astronautics.

Through leadership in both corporate and external science, technology, engineering and math (STEM) programs, Shotwell has helped raise over \$1.8million for STEM programs reaching thousands of students nationwide.

Shotwell received, with honors, her bachelor's and master's degrees from Northwestern University in Mechanical Engineering and Applied Mathematics, and serves on their Board. She has authored dozens of papers on a variety of space related subjects.

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Dr. Robert H. Smith

CEO, Blue Origin

Bob is currently the CEO of Blue Origin where he manages a team that is building reusable launch vehicles, modern powerful rocket engines and all the capabilities that will enable millions of people to live and work in space. He was previously the President of Mechanical Systems and Components at Honeywell Aerospace. This business unit produces air & thermal systems, wheels and brakes, engine/missile/space components and actuation and also manages its DoE businesses.

Bob was also CTO for Honeywell Aerospace from 2009-2016. He was responsible for the product development, innovation and business execution for the engineering function comprising 12,000 engineers worldwide. Prior to that, he was the VP of Advanced Technology for Honeywell Aerospace. In that role, he set technology growth strategies for Honeywell's \$12B aerospace business, won government technology contracts and managed the multi-year technology programs. At United Space Alliance (1999-2004), Bob served as Executive Director of the Space Shuttle Upgrades Development Program. Bob also worked at The Aerospace Corporation. He served as a guidance, navigation & control analyst and a program manager for a number of DoD and national security programs. He eventually became the Systems Director of the NASA Programs Office and the site manager for Houston operations. In that capacity, he served as the business leader for all of Aerospace's efforts at each of the major NASA centers. He has degrees in engineering/applied mathematics/business from Texas A&M, Brown University and MIT's Sloan School of Management. He also has a Ph.D. from the University of Texas in aerospace engineering.

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Mr. Eric W. Stallmer

President, Commercial Spaceflight Federation

President of the Commercial Spaceflight Federation. The CSF is the largest trade organization representing over 75 organizations, dedicated to promoting the development of commercial spaceflight, pursue everhigher levels of safety, and share best practices and expertise throughout the industry.

As CSF President, Stallmer develops the strategy, plans and communications for the organization and works closely with CSF member companies to advocate for the commercial space industry. Prior to joining CSF, Stallmer served as the Vice President of Government Relations at Analytical Graphics Inc. (AGI). Stallmer came to AGI from The Space Transportation Association (STA), a nonprofit, industry trade organization providing government representation to companies with a vested interest in the U.S space launch industry. Prior to that, Stallmer worked on Capitol Hill in the office of then Congressman Tom Coburn.

For over two decades, Stallmer has served as an Officer in the United States Army and Army Reserves. He was awarded the Bronze Star Medal for meritorious service while engaged in combat operations during Operation Iraqi Freedom. He is currently assigned to the Pentagon in the office of the Deputy Chief of Staff Army for Logistics, G-4. Stallmer earned a Masters of Arts Degree in Public Administration from George Mason University and a Bachelor of Arts Degree in Political Science and History from Mount Saint Mary College. He and his wife Amy live in McLean, Virginia with their three children, Charlie, Billy and Catherine.

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Mr. David W. Thompson

Former President and CEO, Orbital ATK

Mr. Thompson is the Hunsaker Visiting Professor of Aeronautics and Astronautics at the Massachusetts Institute of Technology for the 2019-2020 year. He was President and Chief Executive Officer of Orbital ATK, a world leader in aerospace and defense technologies, from its founding in 1982 until its sale to Northrop Grumman in 2018. With annual revenues in excess of \$5.5 billion and a workforce of more than 14,000 people, the company designed, built and operated space, defense and aviation-related systems for customers around the globe. Under his leadership, Orbital ATK carried out more than 1,000 rocket launches and satellite missions over a 36-year period. During that time, the company grew from a start-up to a Fortune 500-class, NYSE-listed public company with an enterprise value in excess of \$9 billion.

Mr. Thompson co-founded one of Orbital ATK's main predecessors, Orbital Sciences Corporation, in 1982 and served as the company's Chairman, President and Chief Executive Officer. Before co-founding Orbital, Mr. Thompson was assistant to the president of Hughes Aircraft Company's Missile Systems Group and was a project manager and engineer at NASA's Marshall Space Flight Center. As a college student, he worked on the first Mars landing missions at Caltech's Jet Propulsion Laboratory and on Space Shuttle projects at NASA's Langley Research Center and Johnson Space Center. He received a B.S. in Aeronautics and Astronautics from Massachusetts Institute of Technology, a M.S. in Aeronautics from California Institute of Technology (Caltech), and a MBA from Harvard Business School. He serves as a member of the Boards of Trustees of Caltech, the Aerospace Corporation, the Carnegie Institution for Science, and the Hertz Foundation as well as the Princeton University Astronomy Advisory Council.

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Ms. Pamela Vaughan

STEM Integration Specialist for the Arkansas Department of Education

Pam Vaughan serves as STEM Integration Specialist for the Arkansas Department of Education. Her passion and enthusiasm for space education has been reflected in her classrooms and in the districts where she was employed throughout her career. From leading her district with a student competition for the opportunity to test an experiment on the International Space Station in 2017 to a student experiment flown on the space shuttle in 1984, her love for STEM education and the space program has been shared with students, community, state and the nation. In 2002, Pam was recognized as the National Space Club Space Educator of the Year and as a Cornell CONTOUR Comet Challenge National Student-Teacher Team Winner. In 2003, the Arkansas Education Association recognized her as the Human Relations Award Winner based on her efforts in promoting STEM education in underserved areas. Her students' successes earned acknowledgement through a Disney Teacher Award in 2004 and selection as a member of the USA Today All-Star Teaching Team in 2005, the only Arkansas educator recognized by both of these groups.

Vaughan and her students have received recognition for a variety of NASA educational programs. Through the Japan Fulbright Memorial Fund Teacher Program, she spread her enthusiasm for space education with students in Japan by sharing her students' work as Phoenix Mars Lander Student Interns. As an active member of the National Science Teachers Association, she served on their Aerospace Advisory Board and the national awards committee. Pam was a contributing author *Today I Made a Difference*, a Collection of Inspirational Stories from America's Top Educators with a forward by Art Linkletter. In 2019, Vaughan was honored as a Henderson State University Distinguished Alumni. Pam and her husband, Gary, reside in Heber Springs, Arkansas.

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Ms. Mandy F. Vaughn

President, VOX Space

Mandy Vaughn is the President of VOX Space. Mandy originally joined Virgin Orbit, VOX Space's parent company, in 2015. As Senior Director of Business Development and Mission Management, she supported business development on the LauncherOne program for both government and commercial customers, and served as mission manager for customers including OneWeb and NASA, in addition to spearheading the creation and registration of VOX Space.

Prior to joining Virgin Orbit, Mandy was with General Dynamics Mission Systems' Space and Intelligence Systems Directorate, where she was responsible for the space control and space protection investment portfolios and analog-to-digital transitions for a variety of SIGINT payload families. She successfully initiated development programs for the next-generation space-based GPS receiver and managed the internal investment of GPS payload development efforts.

Prior to joining General Dynamics, she was a developmental engineer and program manager in the Air Force and a Director with Kinsey Technical Services. She primarily supported programs in the Space Superiority Systems Directorate (SMC/SY) at Los Angeles AFB, CA and earlier the ICBM system program office at Hill AFB, UT. In the Space Superiority mission area, she was the ground segment lead and chief engineer on the Space-Based Space Surveillance program, and then supported a variety of space and ground-based programs for the Directorate. In that role, she supported a multiple Space Situational Awareness and command and control programs supporting integration of requirements and demonstrations between the DoD and the intelligence community. She supported the NRO AS&T and DIA Directorate of Science and Technology in a variety of collection campaigns that spanned various collection system phenomena to demonstrate new systems and operational concepts for critical space operations.

Mandy has a BS in Mechanical Engineering and an MS in Aeronautics and Astronautics, both from MIT.

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Ms. Kathy Warden

Chairman, CEO, and President, Northrop Grumman Corporation

Kathy Warden is chairman, chief executive officer and president of Northrop Grumman Corporation. She was elected chairman of the Northrop Grumman Board of Directors on August 1, 2019, and has served as CEO and president since January 1, 2019. She was elected to the company's board of directors in 2018.

Prior to becoming CEO and president, Warden served as president and chief operating officer, responsible for the operational management of the company's four sectors as well as its enterprise services organization. Her role encompassed all aspects of the company's operations, including leading engagement with the senior customer community and partners around the globe. She also led the integration of Northrop Grumman's Innovation Systems sector.

Previously, she served as corporate vice president and president of Northrop Grumman's Mission Systems and Information Systems sectors.

Warden has extensive experience in operational leadership and business development in government and commercial markets. Prior to joining Northrop Grumman in 2008, Warden held leadership roles at General Dynamics and the Veridian Corporation, she was a principal in a venture internet firm, and she spent nearly a decade with the General Electric Company working in commercial industries.

Warden earned a bachelor's degree from James Madison University and a master's degree in business administration from George Washington University. Currently, she serves as the chair of the Board of Directors of the Federal Reserve Bank of Richmond and is a member of the Catalyst Board of Directors and the James Madison University Board of Visitors.

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Mr. Stuart O. Witt

Founder and Owner, S.O. Witt & Associates, LLC

Former General Manager and CEO, Mojave Air and Space Port.

As General Manager, East Kern Airport District (California), Stuart Witt was the force behind the Mojave Desert's primacy in the space business, as home to XCOR Aerospace, Scaled Composites, Rotary Rocket, Orbital Sciences L1011 Stargazer, Masten Space, Air Launch and Protoflight, Lunar Tech, Rocket Propulsion, and other space-related start-ups. Witt has been directing the expansion efforts of the Mojave Air and Space Port since 2002, dealing with everything from road and water system upgrades to runway, taxiway, lighting, communication, security and ground and air route flow with FAA regulators, commercial builders and state and county planners.

Born in Bakersfield, CA, and raised at Scodie Ranch in the central Sierra Nevada Mountains, Witt is a long-time aviator. He obtained his private pilot's license in 1971, graduated from Cal State Northridge in 1974, from the Naval Aviation Schools Command in 1976 and from the Naval Fighter Weapons School (TOPGUN training) in 1980; he is also a 1996 graduate of the University of Maryland's Center for Creative Leadership. His military career took him to sea as an F-14 Tomcat pilot on based on U.S.S. John F. Kennedy and as an FA-18A project pilot at the Naval Air Warfare Center in China Lake, CA. After the Navy, Witt joined what was then Westinghouse Electric Corporation (now NGC) for nearly nine years as an engineering test pilot on the B-1B, F-16C and F-23. In 1993 he joined Computer Technology Associates, where he managed a \$100-million-range contract and was later promoted to EVP.

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Dr. David Wolf

28-year NASA veteran and astronaut, has spent 168 days in space and conducted seven spacewalks over four separate missions including Space Shuttles Columbia, Atlantis, Discovery, and Endeavor as well as the International Space Station, Russian Space Station MIR, and Spacelab. Prior to being selected as an astronaut, he led teams producing medical research instrumentation for spaceflight, including novel state of the art technology for three-dimensional tissue engineering. Wolf's initial work at NASA stemmed directly from his research while at Purdue in medical ultrasonics. A medical doctor, electrical engineer, and inventor, Wolf has been awarded 17 U.S. patents, received the NASA Exceptional Engineering Achievement Medal, and was named the NASA Inventor of the Year.